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L5: Entry 1 of 2

File: USPT

Jul 11, 1989

US-PAT-NO: 4846033

DOCUMENT-IDENTIFIER: US 4846033 A

TITLE: Apparatus for making blanks and strips of blanks

DATE-ISSUED: July 11, 1989

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 83/94; 83/300, 83/302, 83/303, 83/333, 83/345, 83/667, 83/682

## CLAIMS:

We claim:

1. Apparatus for dividing a web of metallic material into a plurality of strips from which polygonally-shaped blanks are to be made, comprising perforating means for perforating said web at predetermined locations, said perforating means including a first set of cutting tools mounted for rotation in one arcuate direction and a second set of cutting tools mounted for rotation in an opposite arcuate direction such that each cutting tool of said first set cooperates with a corresponding one of said cutting tools of said second set to perforate said web as said web is fed between said first and second sets of cutting tools; longitudinal scroll slitting means for slitting said web along at least one scroll line which extends generally longitudinally along said web, said longitudinal scroll slitting means including a third set of cutting tools mounted for rotation in one arcuate direction and a fourth set of cutting tools mounted for rotation in an opposite arcuate direction such that each cutting tool of said third set cooperates with a corresponding one of said cutting tools of said fourth set to slit said web along said at least one scroll line as said web is fed between said third and fourth sets of cutting tools; and deflecting means positioned between said perforating means and said longitudinal scroll slitting means for deflecting said web such that said web is partially wrapped about said cutting tools of one of said first and second sets of cutting tools and said cutting tools of one of said third and fourth sets of cutting tools.
2. The apparatus of claim 1, further comprising lateral cross slitting means for slitting said web along a plurality of separating lines, each of said separating lines extending generally transversely of said web.
3. The apparatus of claim 2, wherein said lateral cross slitting means cuts said web into a plurality of individual strips.
4. The apparatus of claim 3, further comprising transporting means for transporting said individual strips to stacking means for stacking said individual strips one on top of the other.
5. The apparatus of claim 3, wherein a plurality of blanks can be made from each of said strips, whereby each of said strips can be cut into a plurality of blanks.
6. The apparatus of claim 3, whereby only a single blank can be made from each of said strips, whereby each of said strips is a blank.

7. The apparatus of claim 2, wherein said lateral cross slitting means includes at least a pair of cooperating cutting tools having cutting edges which travel at the same angular velocity, said cutting edges having a substantially zero clearance between them at a point before they reach their maximum engagement.
8. The apparatus of claim 1, wherein said first set of cutting tools is mounted on a first rotatable shaft and said second set of cutting tools is mounted on a second rotatable shaft, said first and second shafts being mounted generally parallel to each other and being driven in synchronization with each other through anti-backlash gearing.
9. The apparatus of claim 8, wherein said first set of cutting tools includes punches and said second set of cutting tools includes dies which cooperate with said punches to punch out polygonally-shaped pieces of material from said web as said first and second sets of cutting tools are rotated conjointly with said first and second shafts, respectively.
10. The apparatus of claim 9, wherein said punches and said dies have a triangular cross-sectional shape and have inclined faces, one of which trails the other.
11. The apparatus claim 9, wherein said perforating means perforates said web before said web is slit along said at least one scroll line by said longitudinal scroll slitting means.
12. The apparatus of claim 11, wherein said third set of cutting tools is mounted on a third rotatable shaft and said fourth set of cutting tools is mounted on a fourth rotatable shaft, said third and fourth shafts being mounted generally parallel to each other and being driven in synchronization with each other through anti-backlash gearing.
13. The apparatus of claim 12, wherein said third and fourth sets of cutting tools include cutting edges having profiles which correspond to the shape of said scroll lines, the cutting edges of said third set leading the cutting edges of said fourth set.
14. The apparatus of claim 13, wherein said leading cutting edges extend beyond a pitch circle of their corresponding cutting tools of said third set and said trailing cutting edges do not extend to a pitch circle of their corresponding cutting tools of said fourth set, whereby said trailing cutting edges have a lower linear velocity than said leading cutting edges.
15. The apparatus of claim 14, further comprising feeding means for feeding said web between said third and fourth sets of cutting tools.
16. The apparatus of claim 15, wherein said feeding means includes draw rolls mounted on said third and fourth shafts.
17. The apparatus of claim 16, wherein said first, second, third and fourth shafts are driven in synchronization with each other through anti-backlash gearing.
18. The apparatus of claim 1, wherein said deflecting means includes a deflector roll which is movable transversely of said web.
19. Apparatus for dividing a web of metallic material into a plurality of strips from which polygonally-shaped blanks are to be made, comprising perforating means for perforating said web at predetermined locations, said perforating means including a first set of cutting tools, including punches, mounted on a first rotatable shaft for rotation in one arcuate direction and a second set of cutting tools, including dies, mounted on a second rotatable shaft for rotation in an opposite arcuate direction, said first and second shafts being mounted generally parallel to each other and being driven in synchronization with each other through anti-backlash gearing such that each punch of said first set of cutting tools cooperates with a corresponding die of said second set of cutting tools to punch out polygonally shaped pieces of material from said web as said web is fed between said first and second sets of cutting tools and as said first and second sets of cutting tools are rotated conjointly with said first and second shafts, respectively, and longitudinal scroll slitting means for slitting said web along at least one scroll line which extends generally longitudinally along said web, said longitudinal scroll slitting means slitting said web along said at least one scroll line after said perforating means perforates said web and said longitudinal

scroll slitting means including a third set of cutting tools mounted on a third rotatable shaft for rotation in one arcuate direction and a fourth set of cutting tools mounted on a fourth rotatable shaft for rotation in an opposite arcuate direction, said third and fourth shafts being mounted generally parallel to each other and being driven in synchronization with each other through anti-backlash gearing such that each cutting tool of said third set of cutting tools cooperates with a corresponding one of said cutting tools of said fourth set of cutting tools to slit said web along said at least one scroll line as said web is fed between said third and fourth sets of cutting tools, said third and fourth sets of cutting tools including cutting edges having profiles which correspond to the shape of said at least one scroll line, said cutting edges of said third set of cutting tools leading said cutting edges of said fourth set of cutting tools and extending beyond a pitch circle of their corresponding cutting tools of said third set of cutting tools and said cutting edges of said fourth set of cutting tools extending short of a pitch circle of their corresponding cutting tools of said fourth set of cutting tools, whereby said cutting edges of said fourth set of cutting tools have a lower linear velocity than said cutting edges of said third set of cutting tools.

20. The apparatus of claim 19, further comprising lateral cross slitting means for slitting said web along a plurality of separating lines, each of said separating lines extending generally transversely of said web.

21. The apparatus of claim 20, wherein said lateral cross slitting means cuts said web into a plurality of individual strips.

22. The apparatus of claim 21, wherein a plurality of blanks can be made from each of said strips, whereby each of said strips can be cut into plurality of blanks.

23. The apparatus of claim 21, wherein only a single blank can be made from each of said strips, whereby each of said strips is a blank.

24. The apparatus of claim 21, further comprising transporting means for transporting said individual strips to stacking means for stacking said individual strips one on top of the other.

25. The apparatus of claim 20, wherein said lateral cross slitting means includes at least a pair of cooperating cutting tools having cutting edges which travel at the same angular velocity, said cutting edges of said at least a pair of cooperating cutting tools having a substantially zero clearance between them at a point before they reach their maximum engagement.

26. The apparatus of claim 19, wherein said punches and said dies have a triangular cross-sectional shape and have inclined bases, one of which trails the other.

27. The apparatus of claim 19, further comprising feeding means for feeding said web between said third and fourth sets of cutting tools.

28. The apparatus of claim 27, wherein said feeding means includes draw rolls mounted on said third and fourth shafts.

29. The apparatus of claim 28, wherein said first, second, third, and fourth shafts are driven in synchronization with each other through anti-backlash gearing.

30. The apparatus of claim 19, further comprising deflecting means positioned between said perforating means and said longitudinal scroll slitting means for deflecting said web such that said web is partially wrapped about said cutting tools of one of said first and second sets of cutting tools and said cutting tools of one of said third and fourth sets of cutting tools.

31. The apparatus of claim 30, wherein said deflecting means includes a deflector roll which is movable transversely of said web.

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L5: Entry 2 of 2

File: USPT

Apr 9, 1974

US-PAT-NO: 3802307

DOCUMENT-IDENTIFIER: US 3802307 A

TITLE: METHOD AND APPARATUS FOR FORMING ENVELOPE BLANKS FROM A WEB

DATE-ISSUED: April 9, 1974

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oggoian; Walter	Libertyville	IL		

US-CL-CURRENT: 83/96; 493/372, 83/140, 83/236, 83/27, 83/50, 83/911

## CLAIMS:

I claim:

1. Apparatus for forming blanks from web material comprising,

reciprocable die means operable to cut blanks of a preselected configuration from web material, said die means having a portion arranged to reciprocate in a substantially horizontal plane,

said reciprocable die means including a first stationary die plate and a second reciprocable die plate,

said first stationary die plate having an aperture therein with a configuration of the blank cut from the web material,

said second reciprocable die plate having a punch member extending therefrom, said punch member having a configuration substantially the same as the blank cut from the web material, said punch member positioned in overlying relation with said aperture in said first stationary die plate,

telescopic support means connecting said second reciprocable die plate to said stationary die plate, said telescopic support means arranged to support said second reciprocable die plate on said stationary die plate as said second reciprocable die plate moves toward and away from said first stationary die plate,

a stripper plate mounted on said second reciprocable die plate and arranged to engage said web material fed into said die means and stop the feed of said web material while said punch on said reciprocable die plate cuts a blank therefrom,

feed means including feed rolls and feed cylinders arranged to continuously rotate at varying velocities to intermittently feed said web material into said die means,

said feed means positioned above said die means so that said web material follows a generally vertical path from said feed means into said die means,

drive means to reciprocate a portion of said die means in timed relation to said feed means and drive said feed means,

receiver means for the blanks formed from said web material, said receiver means having an end portion positioned in the same plane as said die means, said receiver means

arranged to receive and stack said blanks formed from said web material, and

discharge means positioned below said die means to receive the remaining portions of said web material after said blanks are cut therefrom.

2. Apparatus for forming blanks from web material as set forth in claim 1 which includes,

paper web material fed to said die means by said feed means, and

said die means arranged to cut envelope blanks of different configurations from said paper web material.

3. Apparatus for forming blanks from web material as set forth in claim 1 in which said feed means includes,

a first feed cylinder mounted above said die means, said drive means operable to rotate said first feed cylinder at a relatively constant velocity,

a second feed cylinder mounted adjacent to said first feed cylinder and operable to frictionally engage said web material to said first feed cylinder so that web material extending around said first feed cylinder and between said first and second feed cylinders is fed downwardly from said feed means to said die means,

an intermittent third feed cylinder mounted below said first feed cylinder,

a fourth pressure cylinder mounted adjacent to said intermediate third feed cylinder, said fourth pressure cylinder arranged to frictionally engage the web material to said intermittent third feed cylinder, and

means connecting said drive means to said third intermittent feed cylinder so that said third intermittent feed cylinder rotates at a non-uniform velocity and feeds the web material downwardly into said die means at a non-uniform velocity.

4. Apparatus for forming blanks from web material as set forth in claim 1 which includes,

means to support a plurality of rolls of web material in tandem relation to each other and spaced from said feed means,

said support means operable to rotatably support said rolls of web material to permit unwinding of the web material from said rolls,

means to maintain the plurality of webs from said rolls of web material in overlying relation and simultaneously unwinding said plurality of webs from said rolls of web material,

means to feed the plurality of webs in overlying relation to said feed means, and

said feed means arranged to feed said plurality of webs to said die means so that a plurality of blanks are cut during each stroke of said reciprocable portion of said die means.

5. Apparatus for forming blanks from web material as set forth in claim 4 in which,

a plurality of webs of paper material are fed by said feed means to said die means in a generally vertical direction, and

said die means arranged to cut a plurality of envelope blanks from said plurality of webs of paper material.



## End of Result Set

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L3: Entry 5 of 5

File: USPT

Nov 16, 1982

US-PAT-NO: 4358919

DOCUMENT-IDENTIFIER: US 4358919 A

TITLE: Method and apparatus of making a hermetically sealed container

DATE-ISSUED: November 16, 1982

## INVENTOR-INFORMATION:

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US-CL-CURRENT: 53/453, 53/471, 53/559, 53/561, 53/579

## CLAIMS:

What is claimed is:

1. In a process for making a hermetically sealed container which comprises placing a blank on a movable retainer which is at a standstill at a blank placing station; moving said retainer together with said blank in a horizontal direction to a forming station and forming a cup-shaped container body having a flange portion from said blank by using said retainer and a cooperating punch; moving said retainer together with said container body which is engaged with said retainer at said flange portion, in a horizontal direction to a filling station, and filling a product in said container body; and moving said retainer together with said container body filled with said product, in a horizontal direction to a sealing station, and heat sealing said flange portion with a lid member, the improvement which comprises using as said retainer a die which is movable in a horizontal direction and is provided with a cavity having a sidewall of a configuration corresponding to a sidewall portion of said container body; punching said blank from a web of a relatively thin and flexible material at said blank placing station, pushing down and placing said blank on said die, and clamping the peripheral portion of said blank on said die; moving said die on which said blank is clamped to said forming station and then releasing the clamping; and drawing said blank at said forming station using said die and said punch, so as to form said container body the sidewall portion of which is in closely contacting relationship with the sidewall of said cavity.

2. A process claimed in claim 1 wherein said web is formed of a thermoplastic resin and thinner than about 200 .mu.m.

3. A process claimed in claim 1 wherein said web is formed of a laminate consisting essentially of a metal foil having a thickness less than about 100 .mu.m and a thermoplastic resin film having a thickness less than about 200 .mu.m.

4. A process claimed in claim 1 wherein said hermetically sealed container can withstand a retort sterilization treatment.

5. In an apparatus for making a hermetically sealed container which comprises a retainer, a blank placing station provided with means for placing the blank on said retainer, a forming station provided with a punch for forming a cup-shaped container body having a flange portion from said blank in cooperation with said retainer, a filling station provided with means for filling a product in said container body which

is engaged with said retainer at said flange portion, a sealing station provided with means for heat sealing said flange portion with a lid member, and means for moving said retainer in the horizontal direction and stopping said retainer at said respective stations, the improvement in which

a movable die comprises said retainer, said movable die being formed with a cavity having a sidewall of a configuration corresponding to a sidewall portion of said container body,

said moving means adapted for stopping said die under said blank placing station,

a cutter means provided at said blank placing station and having means comprising a movable cutter blade and an operative cooperating stationary cutter blade for punching said blank from a web formed of a relatively thin flexible material,

said placing means is for placing said blank on said die while at a standstill below said cutter means and for pushing down said blank onto said die,

means for clamping a peripheral portion of said blank on said die,

said die, while said peripheral portion is clamped by said clamping means, being movable in a horizontal direction to said forming station by said moving means,

said die cooperating with said forming station for being capable in said forming station for forming said container body by drawing said blank in cooperation with said punch such that said sidewall portion of said container body closely contacts, said sidewall of said cavity of said die,

said moving means moving said die with said container body in said cavity closely contacting said sidewall thereof to said filling station for the filling and then to said sealing station for sealing the lid member to the flange portion, respectively, with said container body continuously in said cavity closely contacting the die.

6. An apparatus claimed in claim 5, wherein

said means for clamping comprises an inside flange portion adapted to clamp the peripheral portion of the blank, and an outside flange portion connected fixedly to said inside flange portion and extending radially and outwardly,

said outside flange portion being supported swingably and biased elastically respectively with respect to said die,

push-down means for pushing down said outside flange portion such that said inside flange portion detaches apart from the upper surface of said die,

said outside flange portion being supported swingably and biased elastically respectively such that said inside portion returns elastically and clamps said blank upon release of the push-down means.

7. An apparatus claimed in claim 5, wherein

said means for placing said blank and pushing down said blank comprises a blank pusher having a flat bottom surface which is slightly smaller in diameter than said blank.

8. An apparatus claimed in claim 5, wherein

said stationary cutter blade is provided independently of said movable die whereby precise positioning of the latter is not required for the blank cutting.

9. An apparatus claimed in claim 5, wherein

said punch has an outer layer portion made of an elastomer surrounding a rigid core thereof and having an outer diameter larger than the minimum diameter of an upper curvature portion of the cavity of the die.

10. An apparatus claimed in claim 1, wherein

said web is resilient and is maintained by its resiliency in said cavity in said closely contacting relationship continuously during movement of the die to the filling

and sealing station and during the filling and sealing steps respectively.